

1. An illumination system comprising:
an encapsulated light source which produces divergent light rays when energized; and
an optically transmissive light distribution cylinder having a first end at a first diameter and an exterior surface in the form of a sequence of progressively smaller diameter cylindrical steps axially extending from said first end, each said step having an outside surface including a plurality of axially spaced generally V-shaped grooves, each said groove including at least one generally frusto-conical reflecting surface extending radially inwardly from said outside surface at an angle α ,
wherein said light source is arranged to deliver said divergent light rays into the first end of said light distribution cylinder for axial transmission therein, at least a portion of said divergent light rays being incident upon said reflecting surface said angle α being calculated to cause internal reflection of said divergent light rays, whereby the internally reflected light rays emerge from said exterior surface.
2. The illumination system of claim 1, wherein said cylinder is molded from optically transmissive plastic.
3. The illumination system of claim 1, wherein said cylinder comprises a wall defining an axial cylindrical space.
4. The illumination system of claim 3, wherein said light source has an optical axis radially offset from said cylindrical space and aligned with said wall at said cylinder first end.
5. The illumination system of claim 1, wherein said cylinder is solid.
6. The illumination system of claim 5, wherein said light source has an optical axis aligned with an axis of said cylinder.
7. The illumination system of claim 1, wherein said light source is an LED.

8. The illumination system of claim 1, wherein said light source is a plurality of LEDs.
9. The illumination system of claim 1, wherein adjacent steps are connected by frusto-conical transition surfaces.
10. The illumination system of claim 1, wherein said cylinder has a second end at said first diameter and said exterior surface includes a second sequence of progressively smaller diameter cylindrical steps axially extending from said second end to meet the sequence of progressively smaller diameter steps axially extending from said first end, the steps of said second sequence being substantially identical to the steps of said first sequence.
11. The illumination system of claim 10, comprising a second light source arranged to deliver divergent light rays into the second end of said light distribution cylinder.
12. The illumination system of claim 1, wherein said light distribution cylinder is surrounded by air, said light distribution cylinder has an index of refraction greater than air and said angle α includes a range of angles, said range dependent upon a differential between the index of refraction of said cylinder and the index of refraction of air.